

REMARKS

Claims pending in the instant application are numbered 1, 3, 4 and 6-21. Claims 1, 3, 4 and 6-21 presently stand rejected. Claims 1, 11, 15, and 17 have been amended. Claim 12 has been cancelled. Claims 27-29 have been added. The Applicant respectfully requests reconsideration of the present application in view of the amendments and the following remarks.

35 U.S.C. § 102 Rejections

Claims 1-3 and 16-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by Huang et al., U.S. Patent Number 5,956,598. Claims 1, 3-4, 6-7, 17-18 and 21 are rejected under 35 U.S.C. § 102(e) as being anticipated by Pan, U.S. Patent Number 6,322,634.

A claim is anticipated only if each and every element of the claim is found in a reference (M.P.E.P. § 2131 citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628 (Fed. Cir. 1987)). The Applicant respectfully submits that the cited references fails to teach each and every element of the claimed invention.

Claim 1 as presently amended expressly recites “lithographically patterning an optical waveguide pathway over a material.”

Huang is directed to fabricating a structure with a rounded corner in integrated circuits (col. 2, lines 59-62). Huang discloses selectively removing portions of a photoresist layer. The photoresist layer to subsequently serve as a mask to anisotropically dry etch a trench in a substrate (col. 3, line 64, to col. 4, line 6). The trench is used in forming an integrated circuit (col. 2, lines 59-62). However, Huang fails to disclose “lithographically

patterning an optical waveguide pathway over a material” as expressly claimed by the Applicant.

Pan is directed to forming a shallow trench isolation structure. Pan discloses using photolithographic patterning techniques to form a patterned recess 110 (col. 3, lines 61-64). Recess 110 is subsequently used to form a shallow trench isolation structure (col. 3, lines 42-45). However, Pan fails to disclose “lithographically patterning an optical waveguide pathway over a material” as expressly claimed by the Applicant.

Accordingly, the present invention would not be anticipated by the cited references. Independent claim 17 distinguishes for at least the same reasons as claim 1. Claims 2, 3, 16 and 18 are dependent claims and distinguish for at least the same reasons as their independent base claims in addition to adding further limitations of their own. Therefore, the Applicant respectfully requests that the instant § 102 rejections be withdrawn.

35 U.S.C. § 103 Rejections

Claims 1, 3-4, 6-7, 17-18 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan in further in view of Huang. Claims 8-10 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan or Pan in view of Huang further in view of Binkley et al., U.S. Patent Number 6,022,671. Claims 11-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan or Pan in view of Huang further in view of Ido et al. (WO 98/37445). Claim 13 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan or Pan in view of Huang further in view of Nakos et al., U.S. Patent Number 6,054,745. Claims 14-15 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan or Pan in view of Huang further in view of Kleinknecht, U.S. Patent Number 4,039,370.

To establish a *prima facie* case of obviousness, the Examiner must show that the references teach each and every element of the claimed invention (MPEP § 2143). As described above, Pan and Huang each fail to disclose, teach, or fairly suggest “lithographically patterning an optical waveguide pathway over a material” as expressly claimed by the Applicant. Accordingly, the present invention would not be rendered obvious by the cited references.

To establish a *prima facie* case of obviousness, the Examiner must show some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings (MPEP § 2143). A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention (M.P.E.P. § 2141.02 citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984)). There mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination (M.P.E.P. 2143.01 citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)).

Since Huang and Pan teach that sharp corners are undesired and seek ways to make sharp corners round (Huang) or cover sharp corners (Pan), one skilled in the art would not look to Huang or Pan for ways to sharpen a corner, as expressly claimed by the Applicant. The Applicant respectfully submits that Huang and Pan, when viewed as a whole, may not be used to establish a *prima facie* case of obviousness because the references lead away from the Applicant’s claimed invention.

Huang discloses that a sharp corner in an integrated circuit causes a leakage current (col. 2, lines 33-45). Huang states a need for an STI structure with a rounded corner (col. 2, lines 45-47). Huang discloses “if this sharp corner 307 is not rounded, it causes the resultant IC device to suffer from a kink effect that considerably degrades the performance of the resultant IC device” (col. 4, lines 30-34). Thus, Huang teaches away from “isotropically etching additional portions of the material from the region of the material to sharpen the corner” as expressly claimed by the Applicant.

Pan discloses that sharp trench corners cause parasitic leakage problems in semiconductor devices (col. 1, lines 40-45). Pan discloses covering the trench corner with a capped shallow trench isolation structure to minimize the corner effects of a sharp trench corner (col. 2, lines 28-29; col. 3, lines 20-25). Pan teaches that sharp corners are undesired and in fact detrimental to a semiconductor device. Thus, Pan teaches away from “isotropically etching additional portions of the material from the region of the material to sharpen the corner” as expressly claimed by the Applicant.

Thus, the Examiner has failed to establish a *prima facie* case of obviousness. Huang and Pan, whether taken singularly or in combination, fail to disclose, teach, or fairly suggest at least one of the expressly recited limitations of the Applicant’s invention as presently claimed. Additionally, there is no suggestion or motivation to modify Pan or Huang. Independent claim 17 distinguishes for at least the same reasons as claim 1. Claims 3-4, 6-7, 18 and 21 are dependent claims and distinguish for at least the same reasons as their independent base claims in addition to adding further limitations of their own. Therefore, the Applicant respectfully requests that the instant § 103 rejections be withdrawn.

New claims 27-29

New claims 27-29 have been added. The Applicant respectfully submits that “isotropically etching the pillars concurrently with the rounded corner to determine completion of the sharpening based on light diffracted from the pillars” as expressly claimed by the Applicant is not disclosed, taught, or suggested by Kleinknecht.

Kleinknecht is directed to optically monitoring the undercutting of a layer being etched. Kleinknecht discloses etching layer 30 (col. 3, lines 5-10). Light beam 38 is diffracted by a diffracting grating pattern on strips 28, the strips 28 positioned on layer 30. As soon as the etchant undercutting of layer 30 has gone W/2 of a strip 28, the strip 28 will fall off, thus decreasing the intensity of the diffracted light beam (col. 4, lines 13-28). Thus, layer 30 is etched, while strips 28 diffract the light beam. However, the Applicant expressly claims “isotropically etching the pillars concurrently with the rounded corner to determine completion of the sharpening based on light diffracted from the pillars.”

Moreover, there is no motivation or suggestion in Kleinknecht to modify the reference. Kleinknecht expressly states, “strips 28 may comprise any material which is resistant to the particular etchant being used” (col. 2, lines 51-55). In contrast, the Applicant expressly claims “isotropically etching the pillars concurrently with the rounded corner to determine completion of the sharpening based on light diffracted from the pillars.”

Thus, Kleinknecht fails to disclose, teach, or fairly suggest at least one of the expressly recited limitations of the Applicant’s invention as presently claimed. Claims 28-29 are dependent claims and are allowable based on their dependency from allowable independent claim 27.

Conclusion

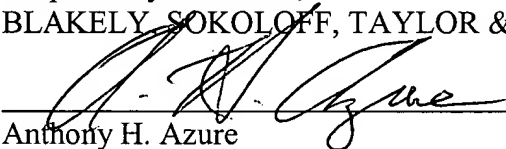
The Applicant submits that in view of the amendments and remarks set forth herein, all instant rejections have been overcome. Therefore, the Applicant respectfully requests the Examiner to reconsider and withdraw all presently outstanding rejections and issue a timely Notice of Allowance in this case.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: April 21, 2004



Anthony H. Azure
Reg. No. 52,580
(206)-292-8600